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FEDERAL COMMUNICATIONS COMMISSION  
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## **SUMMARY**

The Grade B intensity standard is a time-tested principle which has defined the public's television broadcast service for almost fifty years. Our system of free and universal television service has developed and flourished based on the Commission's longstanding commitment to a national system serving local interests. But the Commission could not have built this system without a sound scientific foundation. The Grade B principle is integral to this foundation.

The Grade B intensity standard and the service contours derived from it have survived decades of engineering and regulatory scrutiny and have kept pace with various developments in consumer tastes and equipment enhancements. In this proceeding, the Commission should uphold the bedrock Grade B principle that undergirds the complex, interdependent system of television broadcast regulation. The Commission should not discard the principle that has served localism and the public interest so well in deference to political pressures manufactured by willful satellite infringers in pursuit of short-term commercial gains and unsupported by probative technical showings.

## TABLE OF CONTENTS

	<u>PAGE</u>
I. THE CURRENT CHALLENGE TO THE GRADE B PRINCIPLE IS BASED ON SATELLITE PROVIDERS' BUSINESS AGENDAS, NOT BONA FIDE CONCERNS REGARDING SIGNAL RECEPTION .....	2
II. THE GRADE B INTENSITY STANDARD IS FUNDAMENTAL TO THE BROADCASTING SERVICE AND HAS WITHSTOOD THE TEST OF TIME .....	6
A. The Development of a Terrestrial Television Broadcast Service .....	7
B. Technical Basis and Rationale for the Grade B Intensity Standard .....	10
C. The Grade B Principle Has Withstood Decades of Technical and Political Scrutiny.....	14
III. THE GRADE B INTENSITY STANDARD IS AN ESSENTIAL AND TECHNICALLY JUSTIFIED MEANS FOR DEFINING LOCAL BROADCAST SERVICE FOR SHVA PURPOSES AND OTHERWISE .....	21
A. Sound Engineering Principles Continue to Support the Grade B Principle .....	21
B. Public Policy Supports Retention of the Grade B Standard .....	23
IV. THE USE OF TERRAIN-SENSITIVE MODELS TO PREDICT SERVICE WITHIN THE GRADE B CONTOUR .....	25
V. CONCLUSION.....	26

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

In the Matter of	)	
	)	
Satellite Delivery of Network Signals to	)	CS Docket No. 98-201
Unserved Households for Purposes of	)	RM No. 9335
the Satellite Home Viewer Act	)	RM No. 9345
	)	
Part 73 Definition and Measurement of	)	
Signals of Grade B Intensity	)	

TO: The Commission

**COMMENTS OF THE ASSOCIATION FOR MAXIMUM SERVICE TELEVISION**

The Association for Maximum Service Television, Inc. ("MSTV")<sup>1</sup> submits these comments to explain the fundamental importance of the existing Grade B intensity standard in promoting localism and preserving our system of free, over-the-air television service. While MSTV's comments will focus on the history, rationale and continued validity of the Grade B intensity standard, we also endorse the compelling argument made by NASA, NAB and other broadcasters that the Commission does not have the authority to change the Grade B intensity standard for purposes of the Satellite Home Viewer Act ("SHVA").

The television broadcast service was built around the Grade B principle, and tampering with this principle threatens the integrity of the public's local television service. As shown below, the Grade B intensity standard remains a valid and vital means by which to

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<sup>1</sup> MSTV represents more than 330 local television stations on technical issues relating to the analog and digital television services.

determine over-the-air service to viewers within a station's market, and should not be thrown out to serve the short-term commercial interests of satellite providers.

**I. THE CURRENT CHALLENGE TO THE GRADE B PRINCIPLE IS BASED ON SATELLITE PROVIDERS' BUSINESS AGENDAS, NOT BONA FIDE CONCERNS REGARDING SIGNAL RECEPTION**

MSTV is gravely concerned that short-term politics, rather than sound technical and public policy reasoning, is driving the current attack on the Grade B standard. This issue is not before the Commission because truly unserved viewers on the fringes of broadcasters' service areas are being denied access to network signals via satellite. It is before the Commission because certain satellite providers – who have been violating the law by retransmitting distant network signals to viewers not only at the perimeters but *throughout* broadcast stations' service areas – want unfettered rights to retransmit copyrighted network programming to as many viewers as possible, without regard to whether they can receive an over-the-air local network signal and without broadcaster or network consent.<sup>2</sup> Having lost this battle in court, satellite providers now seek to change the legal standards to permit them to import distant network signals into the heart of local affiliates' service areas, undermining localism and threatening the financial strength of local stations charged with serving the public interest needs of their viewers.

The rulemaking petitions filed by the National Rural Telecommunications Cooperative and EchoStar Communications Corporation in this proceeding were motivated by two federal court rulings, in Miami, Florida and Raleigh, North Carolina, which found that the

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<sup>2</sup> Viewers within a local station's market area often seek satellite service for reasons unrelated to their ability to receive network service over-the-air. Such reasons include access to additional network stations, ability to watch programs several hours earlier or later by watching stations from a distant time zone, access to sports programs that are unavailable locally, and obtaining network programming without installing or maintaining an antenna. None of these reasons supports a compulsory license to retransmit network signals under the SHVA.

satellite provider PrimeTime 24 willfully and repeatedly had violated the "unserved household" restriction under the SHVA.<sup>3</sup> It is not that PrimeTime 24 employed the Grade B intensity standard to identify unserved households and found that standard inadequate; rather, the satellite provider chose to disregard the standard altogether in order to sign up as many customers as possible, regardless of their location or ability to receive an over-the-air network signal. In the Notice of Proposed Rule Making ("NPRM"), the Commission itself notes that "[t]he evidence in the Miami and Raleigh court cases strongly suggests that many, if not most, of those subscribers do not live in 'unserved households' under any interpretation of that term."<sup>4</sup>

In the Miami case, Magistrate Judge Johnson made extensive factual findings, which were affirmed by Judge Nesbitt, of the satellite provider's unlawful behavior.<sup>5</sup> The evidence revealed that PrimeTime 24 "actively markets its services to households across the country," "do[es] not take likely signal strength into account in signing up new customers, and will sell network programming to dish owners in any Zip Code in the United States," uses advertisements to "actively promote the benefits of receiving *additional* network services – including access to more sports programming and 'time-shifting,'" and "suggests that its distributors tell potential subscribers that, if they say that they receive an acceptable quality picture, they will not be eligible to receive network service."<sup>6</sup> Magistrate Judge Johnson found

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<sup>3</sup> See *ABC, Inc. v. PrimeTime 24*, 17 F. Supp. 2d 478, 481 (M.D.N.C. 1998) ("PrimeTime has ignored or turned a blind eye to the necessity of objective signal strength testing and thus willfully and repeatedly provides network programming to subscribers that are ineligible under SHVA."); *CBS v. PrimeTime 24*, 9 F. Supp. 2d 1333, 1344 (S.D. Fla. 1998) ("This evidence demonstrates that PrimeTime 24 knew of the governing legal standard, but nevertheless chose to circumvent it.").

<sup>4</sup> NPRM at ¶ 15.

<sup>5</sup> See *CBS, Inc. v. PrimeTime 24*, 1997 U.S. Dist. LEXIS 22637 (S.D. Fla. June 2, 1997) (Report and Recommendation of Magistrate Judge Johnson to Judge Nesbitt), *affirmed and adopted in relevant part*, 94 F. Supp. 2d 1333 (S.D. Fla. 1998).

<sup>6</sup> *Id.* at \*18, \*29.

that "PrimeTime 24 is making substantial unlawful sales in every market in the nation" and that "a large number of these subscribers can receive a signal not just of Grade B intensity, but of at least Grade A intensity, which is even stronger than Grade B intensity."<sup>7</sup> In the Raleigh case, Judge Bullock made similar findings, concluding that a "mountain of evidence" demonstrated that "[a]lthough Primetime knew of the governing legal standard, it nevertheless chose to adopt one it found more convenient."<sup>8</sup>

After signing up "thousands upon thousands of [ineligible customers], month after month,"<sup>9</sup> satellite providers now urge the Commission to step in and bless their unlawful actions, under the guise of redefining the Grade B intensity standard. Dismissing the threat that distant network signals pose to the local affiliates – a threat long recognized by the Commission – satellite providers argue that the termination of satellite service to illegal subscribers is against the public interest. But it is satellite providers, not local broadcasters, who have created this situation by ignoring the standards Congress set when it enacted the SHVA. Having caused this deplorable situation, satellite providers should not now be rewarded, at the expense of localism, with an expansion of their compulsory license under the SHVA: "[A] company cannot build a

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<sup>7</sup> *Id.* at \*20. When actual signal intensity measurements were taken near the locations of 100 randomly-chosen PrimeTime 24 subscribers in Dade and Broward Counties in Florida, almost all 100 subscribers could receive a signal of Grade A intensity from both the CBS and the Fox stations in Miami. *Id.* at \*23.

<sup>8</sup> *ABC, Inc. v. PrimeTime 24*, 17 F. Supp. 2d 467, 476 (M.D.N.C. 1998), *summ. judgment granted, injunction granted*, 17 F. Supp. 2d 478 (M.D.N.C. 1998). Judge Bullock found that "PrimeTime was broadcasting network programming to thousands of subscribers who received a signal of Grade B intensity as defined by Congress. PrimeTime has simply ignored the Grade B test even though it tried and failed to persuade Congress to adopt a test of eligibility based upon subscriber declarations about over-the-air reception." *Id.*

<sup>9</sup> *CBS*, 1997 U.S. Dist. LEXIS 22637 at \*40-\*41.

business based on infringements and then argue that its unlawful business will be disrupted if it has to comply with the law."<sup>10</sup>

Broadcasters understand that the Commission's desire to enhance satellite's ability to compete against cable also is driving this debate. But increased cable and satellite competition must not be pursued at the expense of technical integrity, the public's broadcast service and localism.<sup>11</sup> Distorting the Grade B intensity standard in order to expand the compulsory license granted satellite carriers under the SHVA would constitute an abandonment of the Commission's longstanding commitment to localism and its adherence to careful technical analysis in its regulatory policies. If Congress and the Commission wish to promote competition between the cable and satellite services, they should foster the delivery of "local-into-local" satellite service, not expand the compulsory license to retransmit distant signals under the SHVA. Our country's

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<sup>10</sup> *Id.* at \*64-\*65. Magistrate Judge Johnson noted that "[c]ourts have uniformly rejected this 'devastating effect' argument by copyright infringers." *Id.* at \*65, citing *Georgia Television Co. v. TV News Clips, Inc.*, 718 F. Supp. 939, 949 (N.D. Ga. 1989) ("[c]opyright law ... dictates that [injury from being required to obey the Copyright Act] merits little equitable consideration and is insufficient to outweigh the continued wrongful infringement of [plaintiffs'] asserted legal rights."); *Concrete Machinery Co. v. Classic Lawn Ornaments, Inc.*, 843 F.2d 600, 612 (1<sup>st</sup> Cir. 1988) ("It would be incongruous to hold that the more an enterprise relies on infringement for survival, the more likely it will be able to defeat the copyright owner's efforts to have that activity immediately halted."); *Apple Computer Inc. v. Franklin Computer Corp.*, 714 F.2d 1240, 1255 (3<sup>d</sup> Cir. 1983) (rejecting "devastating effect" argument because it would permit knowing infringer "to construct its business around infringement"); *Atari, Inc. v. North Am. Philips Consumer Elec. Corp.*, 672 F.2d 607, 620 (7<sup>th</sup> Cir. 1982) ("Advantages built upon ... deliberate[] [infringement] do not seem to us to give the borrower any standing to complain that his vested interests will be disturbed") (quoting *My-T Fine Corp. v. Samuels*, 69 F.2d 76, 78 (2<sup>d</sup> Cir. 1934).

<sup>11</sup> Localism is "a principle underlying the broadcast service since the Radio Act of 1927, [which] serves the public interest by making available to local citizens information of interest to the local community (e.g., local news, information on local weather, and information on community events)." NPRM at ¶ 3. When it enacted the SHVA, Congress limited the compulsory copyright licenses created by the SHVA because it "was concerned that without copyright protection, the economic vitality of local stations, specifically those affiliated with national broadcast networks, might be jeopardized, thus undermining one important source of local information." *Id.*



traditional free, over-the-air, local broadcasting service must not be sacrificed to promote competition between subscription service providers.

## **II. THE GRADE B INTENSITY STANDARD IS FUNDAMENTAL TO THE BROADCASTING SERVICE AND HAS WITHSTOOD THE TEST OF TIME**

In addition to mobilizing political forces to support their infringing activities, satellite providers have manipulated statistical information about the broadcasting service in order to paint a distorted picture of over-the-air television service. The arguments advanced by satellite providers demonstrate a gross misunderstanding of the broadcasting service and the Grade B principle. We believe that a review of the history and rationale of the Grade B principle will assist the Commission in dismissing these criticisms and determining that the Grade B intensity standard continues to be the appropriate standard for defining the local service areas for over-the-air television stations.

The Grade B principle dates back to television's infancy. Our current system of free local television service rests on the coverage considerations defined by the Grade B intensity standard. Over the years, the Commission has reexamined the premises and technical rationale for the Grade B standard, and on every occasion has determined that the standard should be retained. The criticisms of the standard advanced in this proceeding reflect not technical changes in the broadcasting service or material changes in television service areas, but widespread misunderstanding and misrepresentation of the Grade B principle. As shown below, the evidence gathered by the Commission through decades of proceedings involving the television broadcast service demonstrates that the Grade B intensity standard is grounded in sound technical reasoning, and remains valid today. This long history and careful evaluation and reevaluation of the Grade B standard must not be jettisoned through an expedited rulemaking

dictated solely by the extraneous goal of expanding the compulsory license under the SHVA at all costs.

**A. The Development of a Terrestrial Television Broadcast Service**

Commercial television broadcasting in the United States had just begun when the United States entered World War II. During the course of the war, significant technologies (*e.g.*, radar and use of the VHF and UHF frequencies) with applications for over-the-air television were developed. Consequently, the Commission during the last year of the war initiated an Inquiry and Rule Making (Docket 6780) to examine appropriate future use of radio spectrum from 25 MHz to 1000 MHz.

As a result of this proceeding, the Commission in 1945 adopted a VHF television table of allotments for Channels 1 through 13.<sup>12</sup> The television allotments table was based on a minimum co-channel mileage separation of 150 miles and a minimum adjacent-channel mileage separation of 75 miles, covered the largest 140 metropolitan areas and made provision for added channels in other areas.

In the three years following World War II, more than 100 parties filed applications and received construction permits for VHF television stations. By 1948, approximately seventy of these stations were constructed and operating. Among even this limited number of stations, a pattern of destructive mutual interference developed which was of grave concern to the public, broadcasters and the Commission. Because of the unexpectedly severe interference among numerous stations and the promise of still worse problems as additional stations came on the air, the Commission, on September 30, 1948, issued a Freeze

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<sup>12</sup> Subsequently, Channel 1 (44 to 50 MHz), which had been reserved for community stations, was removed from the television spectrum and reallocated for land mobile use.

Order. The Freeze Order halted the processing of further television applications until the Commission studied these interference problems and developed appropriate separations and allotment policies and standards to deal with them.

The Commission then formed a series of government-industry committees to study various matters relating to television allotment principles. One committee analyzed the propagation data that had been accumulated for television stations since 1945 with the objective of updating and improving the earlier propagation curves which had been based on theoretical considerations. This committee developed new empirical propagation curves for low-band and high-band VHF stations and for UHF stations to predict expected field strength as a function of distance and antenna height. These curves provided a basis for determining coverage and interference and provided the engineering foundation for sound allotments policies and standards.

A second government-industry committee devoted its attention to determining what signal levels are required to produce a satisfactory television picture with a typical receiving installation and what desired-to-undesired signal ratios must be achieved in order to provide satisfactory service in the presence of interfering signals. A third committee devoted its efforts to defining various grades of television service to the public. It sought means of describing grades of service in statistical terms that would be more informative than the simple concept of contour levels that had been used in the past. The work of these second and third committees led to the existing definitions of Grade A and Grade B television service, minimum

field strengths for each grade and ratios of desired-to-undesired signals for evaluating interference between stations.<sup>13</sup>

The Commission also established the Television Allotments Study Organization ("TASO") to examine the technical principles that should be applied in television allotment. TASO's world-respected studies represented work conducted over a two-year period by 271 engineers from a variety of organizations and backgrounds who comprised the six TASO engineering panels and their subsidiary committees. TASO studied in-depth and comprehensively all the engineering aspects of television propagation, transmission, reception and interference which were relevant to allotment and separations policies and standards. For example, TASO studied picture quality under various conditions,<sup>14</sup> different types and magnitude of interference under various conditions and their effects, station coverage, receiver systems including receiver performance characteristics and receiving antennas, and television reception.

TASO's report was submitted to the Commission in 1959. This report, together with the record developed and policy goals identified in the Commission's *Third Further Notice of Proposed Rule Making* in the television allotments proceeding ("*Third Further NPRM*"),<sup>15</sup>

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<sup>13</sup> The Commission summarized the work of these committees in its *Third Further Notice of Proposed Rule Making* regarding television allotments. See *Television Broadcast Service*, Third Notice of Further Proposed Rule Making, 16 Fed. Reg. 3072 (Apr. 7, 1951) ("*Third Further NPRM*").

<sup>14</sup> Specifically, TASO coordinated television viewer tests, where a large number of observers rated picture quality on a scale of 1 to 6, in the absence of interference. The scale indicates six grades of picture quality as follows: 1 – Excellent, 2 – Fine, 3 – Passable, 4 – Marginal, 5 – Inferior, 6 – Unusable. Additional observations also were conducted to evaluate impairments such as interference.

<sup>15</sup> In the *Third Further NPRM*, the Commission identified the primary objectives served by a national table of allotments: (1) "to provide television service, as far as possible, to all people of the United States," and (2) "to provide a fair, efficient and equitable distribution of television broadcast stations to the several states and communities." *Third Further NPRM* at 3075. The Commission concluded that these two objectives could be served if a table of allotments was developed according to the following  
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substantiated the basic allotments policies and standards that the Commission had finalized in 1952.<sup>16</sup>

## **B. Technical Basis and Rationale for the Grade B Intensity Standard**

In adopting standards for television broadcasting, the Commission relied on three inter-dependent technical parameters to describe service to an area – time, location and picture quality. Specifically, the Commission defined service in terms of a minimum signal level that is received at the input of a television receiver to provide a desired quality of service. Because the field strengths that induce the receiver signals vary with time<sup>17</sup> and from location to location,<sup>18</sup> it is necessary to include some of the statistics reflecting this variability in the description and protection of the service.

In order to develop the table of allotments and accompanying technical requirements, the Commission developed service standards (such as the Grade A and Grade B standards) that are based on definitions of *minimum* field strengths or intensity levels received within those service areas. These levels are defined in terms of joint probability distribution

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priorities: provide at least one television station to every household in the United States; provide each local community with at least one broadcast station; provide a choice of at least two stations to all parts of the country; provide each community with two stations; and finally, assign remaining channels to communities based on the population and geographic location of the community and service available from stations located in other communities. *Id.*

<sup>16</sup> See *Television Broadcast Service*, Sixth Report and Order, 41 F.C.C. 148 (adopted Apr. 11, 1952).

<sup>17</sup> Variations in the received signal around the median values are caused by slow changes in atmospheric conditions. Signals tend to be stronger in summer than winter, and slightly stronger at night than during the day for paths over land and especially beyond line of sight.

<sup>18</sup> Variation in the received signal around the median values from location to location are generally caused by terrain (hills) or man-made obstructions (buildings) and trees along the different paths or near the receive locations.

functions of time and location<sup>19</sup> – expressed in percentages – and relate to reception of an "acceptable" quality picture<sup>20</sup> using an average receiving antenna installation. These functions define what are commonly known as FCC propagation curves, and are empirically derived based on a large number of broadcast measurements over many paths for long periods of time, and under different terrain, building and vegetation conditions.<sup>21</sup>

The Grade B intensity standard is defined as the signal level required to receive an "acceptable" broadcast picture for at least 90 percent of the time at 50 percent of the locations.<sup>22</sup> Unfortunately, the time and location statistics of the Grade B intensity standard are easily misunderstood. While the predictive Grade B contour indicates the boundary at which 50 percent of the locations are predicted to receive "acceptable" service 90 percent of the time, it does not suggest that up to 50 percent of the locations on that contour are cut off from broadcast service and receive no picture. Instead, these locations may receive a picture that is slightly degraded assuming average receiving equipment. Similarly, it is not the case that locations predicted to receive an "acceptable" picture 90 percent of the time receive no picture 10 percent of the time. During these periods, these locations simply are predicted to receive a signal that is degraded slightly below "acceptable" viewing levels presuming average receiving equipment.<sup>23</sup>

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<sup>19</sup> The technical representation of this probability distribution function is  $F(L,T)$ , where L represents the percent of location and T represents the percent of time.

<sup>20</sup> An "acceptable" picture was defined as a TASO Grade 3 picture, defined by TASO as "Passable. The picture is of acceptable quality. Interference is not objectionable."

<sup>21</sup> Two types of measurements were collected. Continuous recordings of the signal for a period of one year or longer at different parts of the country were collected to obtain statistics relating to time variability of the signal. Short-term measurements in different parts of the country were collected to obtain statistics on location variability.

<sup>22</sup> This is also referred to as the "50/90 standard."

<sup>23</sup> For example, the picture might occasionally degrade from a TASO Grade 3 picture to a TASO Grade 4 (i.e., "Marginal") picture.

Moreover, it is important to remember that the 50/90 location and time factors reflect only the predicted signal strength along the *perimeter* of the Grade B contour – it is not a prediction of service *within* the contour, a distinction glossed over by those opposed to the standard.

The Grade B contour represents an approximation of signal reach based on a statistical prediction of the broadcast signal;<sup>24</sup> it does not represent an actual measure of a particular service signal. The Grade B contour is a statistical boundary, not a rigid wall or fence inside of which service is received all of the time at all locations and outside of which no service is received. Thus, some viewers located outside the Grade B contour may nonetheless receive high quality service. On the other hand, some members of the public located within the Grade B contour may not receive a "signal of Grade B intensity" all of the time. For example, some viewers inside the Grade B contour may not obtain this level of service because of major terrain obstructions or anomalous propagation. Thus, the service obtained by individual households may be better or worse than that suggested by the current prediction technique.

While the 50/90 location and time factors are used to objectively define the boundary of a broadcaster's local service area within which "acceptable" service can be received, they do not actually describe the quality of service received by individual households within and beyond the Grade B contour. The quality of actual signal reception at a particular household is largely dependent on the quality of individual receiving equipment.<sup>25</sup> The Grade B contour

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<sup>24</sup> See, e.g., *Table of Television Channel Allotments*, Notice of Proposed Rulemaking, FCC 80-545, 833 F.C.C.2d 51, 90-91 (adopted Sept. 18, 1980) ("The strength of a television signal more than a few miles from the transmitting antenna cannot be predicted with a high degree of certainty. . . . Estimates of the variation of signal strength with distance are obtained from curves contained in the Commission's rules. These curves were derived from many measurements on different stations under varying conditions and therefore represent average values . . .").

<sup>25</sup> The picture displayed on a television screen – regardless of whether it is delivered terrestrially or via satellite – is the end product of three distinct, but interrelated systems: (1) the television transmitter and  
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presumes standard (mid-quality range) receiving equipment at a thirty-foot elevation.<sup>26</sup> In fact, both inside and outside the Grade B contour, the receiving equipment actually used by individual households may be better or worse than the norm assumed for purposes of defining the Commission's service contours. In areas on the edges of and beyond the Grade B contour, viewers consistently use higher quality receiving equipment (especially the antenna and the receiving installation) which can more than compensate for any signal degradation that occurs over distance or for other factors which might otherwise impose service limitations.<sup>27</sup> Thus, the picture quality these households actually receive will be superior to the reception predicted using the Grade B intensity standard's equipment presumptions.

Antenna installation and orientation also play a critical role in signal reception and picture quality. For example, higher gain antennas and careful installation may compensate for antenna mounts lower than thirty feet. Similarly, individual households may mount their antennas at heights above thirty feet, thereby compensating for any signal degradation they would otherwise experience using the standard elevation presumed for determining the Grade B contour. By taking such basic steps, many households can use properly installed, commercially

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its antenna; (2) the media through which the signal travels after leaving the transmitting antenna; and (3) the receiving systems which include the receiving antenna, the transmission line between the receiving antenna and the receiver, and the receiver (television set) itself. Each of these factors may have a significant effect on the reception and picture quality displayed on the television screen.

<sup>26</sup> The thirty-foot elevation was chosen because it reflected the height of an average two-story home at the time the standard was adopted. Of course, single-story homes were considered in developing the thirty-foot presumption, and it was deemed reasonable that such households would install taller antenna mounts to compensate for lower roof elevations in cases where such mounts might be necessary to improve signal reception.

<sup>27</sup> See *Amendment of Parts 1, 63, and 76 of the Commission's Rules to Implement the Provisions of the Cable Communications Policy Act of 1984*, Second Report and Order, FCC 88-128, 3 FCC Rcd. 2617, 2619 (adopted Mar. 24, 1988).



available receiving equipment to compensate for signal degradation that occurs over distance or due to terrain and can thereby receive a high-quality, over-the-air broadcast picture. These households are not in fact "unserved" because, in reality, these particular locations enjoy perfectly "acceptable" over-the-air service.<sup>28</sup>

**C. The Grade B Principle Has Withstood Decades of Technical and Political Scrutiny**

Once the purpose and nature of the Grade B intensity standard are understood, its regulatory application can be fully appreciated. The Grade B intensity standard and the Grade B contour it defines have been highly valuable regulatory tools throughout broadcast television history, and remain valuable today. The Grade B principle is an integral part of a complex system of FCC broadcast regulation. It forms the structural basis for the Commission's table of television channel allotments, including its new table of digital television allotments. Redefining the Grade B intensity standard would weaken this fabric of regulations and policies and undermine the foundation on which local television service is based.

Since the adoption of the table of allotments in the *Sixth Report and Order*, the Commission has on several occasions reconsidered whether using the Grade B contour to estimate a television broadcaster's over-the-air reach is still appropriate. To date, no technical, policy or other justification for abandoning the Grade B intensity standard has been provided and no alternative model has been proposed that is both more accurate and efficient. The fabric of regulation and policies of which the Grade B principle is such an integral part is the result of the Commission's careful balancing of policy objectives, consumer needs and scientific and

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<sup>28</sup> In addition, the Grade B contour predicts 50/90 coverage at multiple locations, not for particular households. Thus, one household may encompass multiple "locations" along the Grade B contour, and each household unit may install its antenna at the best "location" for reception, leaving the poorer reception locations unused and unnecessary.

empirical fact. Any attempt to substitute an alternative model will have destructive repercussions for the Commission-crafted national/local broadcast system which has stood strong throughout decades of technological and political change, and which has been repeatedly endorsed by Congress and the courts.<sup>29</sup> Furthermore, changing the Grade B intensity standard will implicate relationships within the broadcasting industry, such as network-affiliate relationships and advertising contracts. The Grade B intensity standard continues to provide a reasonable estimate of service even as developments in consumer demand and technology have evolved. It should not be abandoned to serve the short-term political demands of one industry at the expense of the enduring public interest goals incorporated in localism.

Although the TASO study on which the Grade B intensity standard is based was conducted almost forty years ago, the laws of physics have not changed and the study's results remain accurate in today's world. The Commission consistently has found that the Grade B intensity standard remains an accurate and practical predictor of station coverage. The

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<sup>29</sup> See, e.g., *Petition for Rulemaking to Amend Television Table of Assignments to Add New VHF Stations in the Top 100 Markets and to Assure that the New Stations Maximize Diversity of Ownership, Control and Programming*, Memorandum Opinion and Order and Notice of Proposed Rulemaking, FCC 77-169, 63 F.C.C.2d 840, 853-54 (adopted Mar. 7, 1977) ("*First Drop-Ins Order*") ("The all-channel legislation was viewed as a Congressional commitment to an intermixed VHF/UHF system, with the key goal of developing UHF stations. The balance between the short-term interim drop-in proposal and the long-range UHF goals was tipped in favor of UHF. The Commission was persuaded that the drop-in costs of dislocation of viewing service due to interference and the impact on UHF development could not now be outweighed by the benefits."); see also *Petition for Rulemaking to Amend Television Table of Assignments to Add New VHF Stations in the Top 100 Markets and to Assure that the New Stations Maximize Diversity of Ownership, Control and Programming*, Report and Order, FCC 80-505, 81 F.C.C.2d 233, 234 (adopted Sept. 9, 1980) ("*Second Drop-Ins Order*") (discussing generally the significance of the All Channel Receiver Act for preserving spacing requirements in UHF and VHF); H.R. Rep. No. 100-887, pt. 1, at 14-15 (1988), H.R. Rep. No. 100-887, pt. 2, at 19-20 (1988) (accompanying the Satellite Home Viewer Act) (discussing importance of the existing network affiliate distribution system for preserving localism and serving the public interest). The Supreme Court has also recognized the importance of the Commission's system for providing each local community with a source of information about local concerns. See *Turner Broadcasting Sys. v. FCC*, 512 U.S. 622, 663 (1994); see also *Turner Broadcasting Sys. v. FCC*, 520 U.S. 180, 137 L. Ed. 2d 369, 388 (1997).

Commission has revisited the premises and technical rationale that underlie the Grade B intensity standard and the Grade B contours in several proceedings since the adoption of the original television table of allotments in 1952, and each time has concluded that the technical analysis on which the standard and contours are based remains valid. Furthermore, the Commission has consistently determined that use of the Grade B intensity standard and contours serves the public interest by providing an accurate prediction of broadcast coverage.

For example, in 1975, the Commission issued a final decision in a proceeding to consider the technical validity of the Grade B intensity standard and proposed amendments to the engineering methods underlying that standard, as well as potential implications for changes to that standard for broadcasters, cable systems and land mobile services.<sup>30</sup> The Commission concluded that, in deciding whether to adopt new engineering methods, consideration must be given to the consequences of changing its existing calculation formulae, "both with respect to the efficiency, expeditiousness and finality of regulatory processes, and the impact of the rule changes on those whose activities are under the jurisdiction of the regulatory body."<sup>31</sup> The Commission therefore declined to replace the Grade B contours with individual field strength measurements because the use of such measurements already had greatly complicated and lengthened many Commission proceedings.<sup>32</sup> The Commission emphasized that the Grade B intensity standard originally was designed to provide a predictive measure of television service,

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<sup>30</sup> See *Field Strength Curves for FM and TV Broadcast Stations*, Report and Order, FCC 75-636, 53 F.C.C.2d 855, 856 (adopted May 29, 1975) ("*Field Strength Order*").

<sup>31</sup> *Id.* at 860.

<sup>32</sup> See *id.* at 866, 868 ("Since questions have been raised as to the reasonableness of certain of the assumptions made by the Commission in its computation of the proposed new Grade B values, we have decided not to press this proposal further. While we might attempt to support further the figures we have employed, we consider such an effort unnecessary. There is no urgent need, from an engineering

(continued...)

and that the use of precise individual measurements of signal strength would overburden broadcast proceedings.<sup>33</sup> The Commission therefore considered and discarded a method of individualized measurements as overly complicated, unnecessary and unduly burdensome for the regulatory process.<sup>34</sup>

Although the Commission did adopt revised formulae for calculating propagation curves to improve their predictive accuracy, in part by including a "terrain roughness factor" for use in appropriate circumstances, it did so only after careful study and evaluation of the validity of the proposed technical changes and their implications for the Grade B contours.<sup>35</sup> The Commission then studied the implications of its new formulae for the Grade B principle and concluded that, taking into account developments in receiver technology, the Grade B intensity standard continued to predict accurately the areas in which viewers could receive an "acceptable" quality picture.<sup>36</sup>

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(footnote cont'd)

standpoint, to redefine the Grade B contour, and since other considerations do not make such a course of action expedient, we will not pursue it.").

<sup>33</sup> See *id.* at 869.

<sup>34</sup> Any decision now to complicate the regulation of broadcast television remains unjustified and would run counter to the mandate and intent of the Telecommunications Act of 1996 to reduce unnecessary and burdensome regulation.

<sup>35</sup> See *Field Strength Order* at 861-63; see also *Amendment of Part 76 to Modify or Eliminate the Use of Signal Strength Contours for Purposes of Cable Television System Regulation*, Notice of Proposed Rulemaking, FCC 75-635, 53 F.C.C.2d 1009, 1009 (adopted May 29, 1975) ("These new curves, proposed for adoption several years ago, were developed by a Government-Industry Working Group which utilized extensive propagation data accumulated since 1952. Our adoption of these curves followed several years of intensive engineering study and thorough analysis and consideration of the comments and replies elicited . . ."). The Commission also carefully examined the engineering criticisms leveled at the new propagation curves, but found that these criticisms relied on misapplication of the available data. See *Field Strength Order* at 861-62.

<sup>36</sup> See G.S. Kalagian, *A Review of the Technical Planning Factors for VHF Television Service Research & Standards Division*, Office of Chief Engineer, FCC/DET RS 77-01 (Mar. 1, 1977); see also Attached Engineering Statement of Jules Cohen at 5.

The Commission has considered challenges to the Grade B principle in other contexts, but always has concluded there was no technical reason sufficient to justify undermining the Grade B intensity standard. For example, in considering a petition requesting ninety-six new, short-spaced drop-in channels and a reconsideration of its general distance separation policies, the Commission retained its distance separations requirements for UHF and VHF broadcast stations and thereby implicitly endorsed the Grade B principle on which those spacing requirements are based.<sup>37</sup> Although the Commission conducted a thorough review of the engineering basis for its table of allotments, including an examination of the Grade B intensity standard and the distance separation requirements and interference levels which depend on that standard, it concluded that a reduction of its separation requirements was not justified.<sup>38</sup> After evaluating each proposed drop-in individually, the Commission concluded that only four proposals possessed sufficient potential benefits to justify further consideration in a rulemaking proceeding.<sup>39</sup>

The Commission has reaffirmed the technological basis of the Grade B intensity standard in the context of certain waiver requests which included general challenges to the intensity standard itself. For example, the Commission in 1975 denied a request by WETA for an experimental broadcast license in Washington, D.C., and for waiver of the co-channel and adjacent channel separation requirements.<sup>40</sup> WETA argued, in part, that "the TASO study, the

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<sup>37</sup> See *First Drop-Ins Order* at 853-54.

<sup>38</sup> See *id.* at 856-57.

<sup>39</sup> See *id.* at 893. The Commission later granted all four drop-in proposals, but recognized that the decision represented "a significant departure from the past and cannot be taken lightly." *Second Drop-Ins Order* at 234.

<sup>40</sup> *Application of Greater Washington Educational Telecommunications Association (WETA), Washington, D.C.*, Memorandum Opinion and Order, File No. BPEX-238, 53 F.C.C.2d 910 (adopted June 10, 1975) ("WETA Order").

last significant study of allotment principles, was conducted thirteen years ago and has been followed by the development of new technology, which offers hope of possible modification of the allotments scheme without undue degradation of the primary service of existing stations."<sup>41</sup>

In its decision to deny the request, the Commission noted that WETA had failed to identify any specific technological developments or studies that would justify revisiting the TASO study:

"Other than vague reference to technological developments which remain unidentified, nothing proposed in the way of equipment contemplates new or unique transmission or receiving facilities which would indicate that the present standards or the TASO results are no longer valid."<sup>42</sup>

In 1988, the Commission considered the applicability of the Grade B contours with respect to its cable regulations and again upheld the Grade B intensity standard as the best predictor of local television service.<sup>43</sup> Noting that the Grade B contour provides a theoretical prediction of broadcast coverage and signal availability, the Commission re-endorsed the Grade B principle:

The Grade B contour has long been employed by the Commission to define the expected range in which a broadcast television station's signal *can be adequately received*. We also note that persons living in areas located in the outer reaches of the service areas of broadcast stations (for example, at the edge of a predicted Grade B contour) can, and generally do, take relatively simple measures such as installation of an improved roof-top antenna and careful location and orientation of that antenna to enhance their off-the-air reception. *Thus, the predicted Grade B contour is more*

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<sup>41</sup> *Id.* at 912.

<sup>42</sup> *Id.* at 918.

<sup>43</sup> See *Amendment of Parts 1, 63, and 76 of the Commission's Rules to Implement the Provisions of the Cable Communications Policy Act of 1984*, Second Report and Order, FCC 88-128, 3 FCC Rcd. 2617 (adopted Mar. 24, 1988).

*likely to approximate the area where a broadcast signal is, in fact, receivable.*<sup>44</sup>

The Commission also noted that many viewers beyond stations' Grade B contours receive adequate over-the-air signals, so that many broadcasters have local audiences well beyond those contours.<sup>45</sup> The Commission thus retained the Grade B intensity standard as an accurate predictor of signal availability.<sup>46</sup>

Most recently and after extensive in-depth deliberation over the issue, the Commission reaffirmed the Grade B intensity standard in the digital television ("DTV") context. The recent table of allotments developed for DTV was designed specifically to mirror the Grade B contours for traditional television service. The Commission and the entire rulemaking process devoted the most sophisticated engineering resources to developing a table for digital television based on the Commission's conviction that "providing DTV allotments that replicate the service areas of existing stations offers important benefits for both viewers and broadcasters."<sup>47</sup> The Commission concluded that a high degree of service replication would ensure broadcasters could reach the same audience with both DTV and analog signals and provide viewers with new digital signals for the same stations they currently receive.<sup>48</sup>

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<sup>44</sup> *Id.* at 2619 (emphasis added).

<sup>45</sup> *See id.* at 2620 n.22.

<sup>46</sup> *See id.* at 2625-26.

<sup>47</sup> *Advanced Television Systems and Their Impact upon the Existing Television Broadcast Service*, Sixth Report and Order, FCC 97-115, 12 FCC Rcd. 14,588, 14,605 (adopted Apr. 3, 1997).

<sup>48</sup> *See id.* at 14,605-06.

### **III. THE GRADE B INTENSITY STANDARD IS AN ESSENTIAL AND TECHNICALLY JUSTIFIED MEANS FOR DEFINING LOCAL BROADCAST SERVICE FOR SHVA PURPOSES AND OTHERWISE**

The satellite industry has created a smokescreen of alleged public policy and technical reasons for changing the Grade B intensity standard. These arguments fail, however, to camouflage the true scientific and public interest rationales which support retaining the Grade B principle, the foundation of the public's television broadcast system. In arguing for a redefinition of the Grade B contour, satellite providers have given no consideration to the full regulatory impact of their proposals. If the Commission yields to these pressures and fails to analyze fully the impact of the proposed change on its underlying regulatory policies, it will be faced with a more, not less, complex and burdensome regulatory regime – and one that is far less grounded in solid science.

Satellite providers portray broadcasters as not caring about whether their viewers receive a quality signal. But it is in broadcasters' interest to provide dependable quality service throughout their local service areas. Broadcasters depend on this full and effective coverage for their financial health and stability, for it is a local station's ability to reach its viewers that is valuable to advertisers. As a result, broadcasters invest money and effort to produce the best possible service within their Grade B contours and to give their advertisers access to more households and viewers.

#### **A. Sound Engineering Principles Continue to Support the Grade B Principle**

While the technology of television transmission and reception equipment has improved since the Commission adopted the Grade B principle and established the table of allotments in 1952, the Grade B intensity standard has endured. The Grade B standard continues to predict accurately the local service areas for broadcast television, and no party has advanced



an accurate technical justification to render the standard obsolete. As shown by the above discussion of the standard's endurance before the Commission, technical challenges to the Grade B intensity standard have been carefully considered but discredited over the years. Sound science still supports the Grade B principle.

Some have argued that viewers have become more demanding of television service quality and that therefore the TASO service grades underlying the Grade B standard no longer adequately reflect what is regarded as quality service. But while viewer perceptions may be more demanding today than in previous years, this trend has been more than compensated for by the marked advances in the performance of receivers and receiving equipment.<sup>49</sup> Specifically, while it is true that viewer expectations have increased, resulting in demand for higher quality pictures, the noise levels of television viewers have dramatically fallen well below the levels assumed by TASO in the 1950s. Because these advances in viewer taste and television technology offset each other, the Grade B intensity standard remains an accurate reflection of "acceptable" service.<sup>50</sup> Indeed, if technological and other developments were taken into account, the net result would suggest an expansion of the Grade B contour, not its constriction.

In sharp contrast, the modifications that would severely reduce local broadcast service areas proposed by the satellite industry have no similar technical foundation. No engineering analysis comparable to the TASO study or even the working group report on

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<sup>49</sup> This improvement in reception technology was recognized as early as 1980, when the Commission considered increasing the number of VHF television allotments. *See Table of Television Channel Allotments*, Notice of Proposed Rulemaking, FCC 80-545, 83 F.C.C.2d 51, 84 (adopted Sept. 18, 1980) ("[T]he maturation of home rooftop antenna technology to provide a more consistently high quality antenna means that today rural viewers are now more likely to employ a receiving antenna superior to their 1952 counterpart. Furthermore, recent advances in television reception technology may result in the availability of even better reception systems before the effect of the proposed rule changes occurs.").

<sup>50</sup> *See* Attached Engineering Statement of Jules Cohen at 5-6.

modified field strength values has been provided. Indeed, satellite providers have demonstrated no clear understanding of the basic scientific principles which underlie the Grade B contour or its value and accuracy as a predictive tool. Nor have they demonstrated or even alleged that households receiving a Grade B intensity signal fail to receive an "acceptable" picture over-the-air. Satellite providers also have failed to show that substantial numbers of households within a station's Grade B contour do not receive adequate broadcast service. Rather than rigorous scientific testing and measurement, they rely on sweeping overgeneralizations to support their claims. The satellite industry has given the Commission no technical or other justification for any proposed modification.

**B. Public Policy Supports Retention of the Grade B Standard**

As the Commission is well aware, the Grade B principle is the bedrock of the public's local broadcast system. Indeed, it is the foundation for most of the Commission's interrelated policies regarding the transmission, protection from interference, carriage and retransmission of broadcast signals. Any modification by the Commission of broadcasters' service areas, specifically by redefining or abandoning the Grade B intensity standard, will create uncertainty and confusion in existing, long-standing structural arrangements in the broadcast industry.

For example, the network-affiliate relationship and the resulting national and local partnership, which make our broadcast system uniquely valuable, would be severely undermined if the Grade B principle were abandoned. The relationship was established so that networks could build a national audience while local stations served the individual needs of their particular markets. That relationship has flourished because it has served the varied needs of broadcast viewers. By changing local service areas, the Commission would weaken our broadcasting

system's essential local character, which was an overriding policy concern in the Commission's original development of the allotments table. Specifically, by reducing the size of local service areas by a stroke of the pen (and by nothing else), the Commission will erode the market coverage each affiliate provides. Viewers well within local affiliates' service areas will obtain their network service not from their free, over-the-air, local stations, but from a subscription satellite service that imports national programming or signals from distant communities. These viewers, then, would not access the valuable local news and other programming designed specifically to serve their communities. As a result, networks will renegotiate affiliates' compensation to reflect lost market coverage, to the detriment of the individual affiliates who will become less valuable to the network and less able to acquire and produce high quality program offerings. Though perhaps not as dramatic, there could be a similar shift in station negotiations with program syndicators.

Similarly, eroding the size of local service areas would cause advertisers and local stations, based on smaller market reach, to renegotiate advertising contracts. The ability of local stations to market time to local advertisers will be handicapped by smaller audiences, and reduced revenues will impair broadcasters' ability to continue providing quality local service to their coverage areas.<sup>51</sup> In addition, this change in the economics of operating local stations will impact the network-affiliate relationship by shifting the economic balance of power away from local stations and toward the networks – further undercutting the bedrock principle of localism.

Alteration of the local service areas for television stations would contradict the Commission's recent conclusions in the DTV proceeding regarding the value of coterminous

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<sup>51</sup> The Commission has long recognized that exclusivity protections for local affiliates are essential to preserve advertising revenues and thereby secure the financial health of local stations.

service and would undermine the newly developed digital table of allotments. Notably, the remarkable scientific effort to gauge service based on objective standards in that proceeding contrasts sharply with the impetus for this proceeding, which has been launched not to implement scientific principles but to advance the commercial interests of satellite operators.

#### **IV. THE USE OF TERRAIN-SENSITIVE MODELS TO PREDICT SERVICE WITHIN THE GRADE B CONTOUR**

In the NPRM, the Commission solicits comment on its proposal that the "Longley-Rice propagation model, as implemented for DTV, be used to refine the Grade B service prediction for the purpose of SHVA determinations."<sup>52</sup> The Commission observes that "[t]he Longley-Rice propagation model is the most widely-used private means of predicting a Grade B coverage area for SHVA purposes."<sup>53</sup> A terrain sensitive predictive methodology could improve the accuracy with which a broadcaster or satellite provider predicts whether Grade B intensity is achieved in particular areas. Of course, the same objective can be achieved with even greater confidence as to a particular household by the measurement option provided for in the SHVA. It is essential, however, that any predictive methodology is implemented in accordance with the existing Grade B intensity standard, to ensure that application of the methodology does not compromise the integrity of local broadcasters' service areas.

In the context of the digital television proceeding, the Commission determined that use of the Longley-Rice methodology was the most appropriate means for predicting signal strength throughout a station's existing service area, taking terrain into account. The Longley-Rice methodology, as developed and implemented for the digital television proceeding for

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<sup>52</sup> NPRM at ¶ 34.

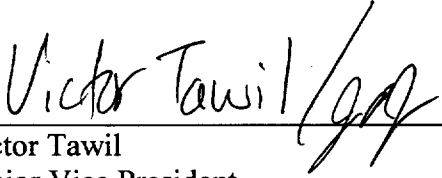
<sup>53</sup> *Id.*

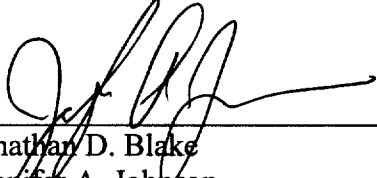
computing an NTSC service, could effectively be used to predict service areas for purposes of the SHVA.

**V. CONCLUSION**

For the foregoing reasons, MSTV respectfully urges the Commission to dismiss the challenges to the Grade B intensity standard raised by the satellite industry and reaffirm its longstanding adherence to the Grade B principle.

Respectfully submitted,

  
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*Counsel for The Association for  
Maximum Service Television, Inc.*

December 11, 1998

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**ENGINEERING STATEMENT ON BEHALF OF  
MAXIMUM SERVICE TELEVISION, INC.  
IN SUPPORT OF COMMENTS  
CS DOCKET NO. 98-201**

1. This engineering statement has been prepared on behalf of Maximum Service Television, Inc. (MSTV) in support of comments responding to the Notice of Proposed Rule Making, CS Docket No. 98-201. The statement provides background on the history of the establishment of Grade B field strength and the logic supporting its use as an indicator of the availability of NTSC television broadcast service.

2. On May 6, 1948, the Commission issued a Notice of Proposed Rule Making (FCC 48-1569) to amend the Table of television channel assignments.<sup>1</sup> Evidence received pursuant to the Notice indicated the necessity for revision of the Commission's Rules, Regulations and Standards relating to the technical phases of the television broadcast service. Accordingly, the Commission issued a Report and Order (FCC 48-2182) on September 30, 1948, suspending action on new and pending applications in the television service to provide time to reconsider its technical standards and devise a new proposed Table of Assignments consistent with whatever revised standards were adopted. Processing of applications was not

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<sup>1</sup> Sixth Report and Order; Docket Nos. 8736, 8975, 8976 and 9175; FCC 52-294. Adopted April 11, 1952, Released April 14, 1952; ¶1.

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Engineering Statement  
MSTV Comments, Docket No. CS 98-201

Page 2

resumed until July 1, 1952, following the adoption of the Sixth Report and Order in April, 1952.

3. In 1951, during the "freeze" in processing requests for new or modified television facilities, new standards were proposed, based on the best available engineering information, for predicting station coverage and interference.<sup>2</sup> The Third Notice provided a derivation of signal strength levels for the prediction of Grade B coverage for rural areas and Grade A coverage for urban areas. Those predicted levels for defining coverage have served well the needs of the Commission and the public, and still provide a valid measure of service.

4. The Commission started with the ratio of peak visual carrier to root mean square (RMS) noise (C/N) necessary to provide an acceptable picture, then applied appropriate system parameters to determine the field strength necessary to achieve that acceptable picture. Since propagation in the part of the spectrum used for television broadcasting requires a statistical approach, the Commission adopted as its criterion service to the best 50 percent of locations for 90 percent of the time at the outer limit of Grade B. Following is

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<sup>2</sup> Third Notice of Further Proposed Rule Making; Docket Nos. 8736, 8975, 8976 and 9175; FCC 51-244; Adopted March 21, 1951, Released March 22, 1951; See, particularly, Appendix B.

*Jules Cohen, P.E.*  
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Engineering Statement  
MSTV Comments, Docket No. CS 98-201

Page 3

the derivation of required signal strength based on a prediction of median signal strength magnitude.<sup>3</sup>

	Channels 2-6	Channels 7-13	Channels 14-83 <sup>4</sup>
C/N	30 dB	30 dB	30 dB
Thermal Noise	7	7	7
Receiver Noise Figure	12	12	15
Trans. Line Loss	1	2	5
Ant. Effective Length <sup>5</sup>	-9	0	3
50% Terrain Factor	0	0	0
90% Time Factor	6	5	4
Median Field Strength <sup>6</sup>	47	56	64

5. At the outer limit of Grade A coverage, the criterion adopted by the Commission required the better 70 percent of locations to receive acceptable service 90 percent of the time. In addition, the Commission assumed the use of lower gain antennas (a simple dipole for channels 2-13 and 8 dB gain for channels 14-83), and factors to overcome urban noise

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<sup>3</sup> *Ibid.*

<sup>4</sup> The UHF channels now include only 14 through 69.

<sup>5</sup> For channel 2-13, an antenna gain of 6 dB over a dipole was assumed. For channels 14-83, an antenna gain of 13 dB over a dipole was assumed.

<sup>6</sup> Decibels above one microvolt per meter (dBμ).



*Jules Cohen, P.E.*  
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Engineering Statement  
MSTV Comments, Docket No. CS 98-201

Page 4

and interference for the VHF, channels 2-13. The derivation of Grade A signal strength as set forth in Appendix B of the Third Notice follows.

	Channels 2-6	Channels 7-13	Channels 14-83
C/N	30 dB	30 dB	30 dB
Thermal Noise	7	7	7
Receiver Noise Figure	12	12	15
Trans. Line Loss	1	2	5
Ant. Effective Length	-3	6	8
70% Terrain Factor	4	4	6
90% Time Factor <sup>7</sup>	3	3	3
Urban Noise and Intf.	14	7	0
Median Field Strength	68	71	74

6. The suitability of the criterion for acceptable picture quality was affirmed by the work of the Television Allocations Study Organization (TASO)<sup>8</sup>. From the report of Panel 6 - Levels of Picture Quality - "Nearly 200 observers were used, and about 38,000 individual assessments were made." (p. 449) The reported results of the tests conducted at the David Sarnoff Research Center of RCA at Princeton, New Jersey, showed in tests of random noise

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<sup>7</sup> The 90% time fading factor for Grade A is less than for Grade B because of the lesser distance to the contour.

<sup>8</sup> Engineering Aspects of Television Allocations, Report of the Television Allocations Study Organization to the Federal Communications Commission; March 16, 1959.

*Jules Cohen, P.E.*  
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Engineering Statement  
MSTV Comments, Docket No. CS 98-201

Page 5

impairment that the median viewer found a picture with signal to interference ratio of approximately 27.5 dB to be of acceptable quality and 70 percent of the viewers found a picture with signal to interference ratio of approximately 30 dB to be of acceptable quality.

7. In a 1977 review of the planning factors adopted in 1952<sup>9</sup>, Kalagian concluded that the appropriate levels for Grade B coverage would be 44 dB $\mu$  for Zone I low VHF, 45 dB $\mu$  for Zone II or III low VHF, 54 dB $\mu$  for Zone I high VHF and 56 dB $\mu$  for Zone II or III high VHF. Based on Hazeltine Research Report No. 3614, done under contract to PBS and filed as Exhibit 2 in Petition for Rule Making RM-2577, August 11, 1975, Kalagian used receiver noise figures of 6 dB for low VHF and 7 dB for high VHF as more appropriate for currently produced receivers than the 12 dB that the Commission had used in 1952.

8. Since the standard for an "acceptable" picture was established at a time when television reception was a relatively new phenomenon to its audience, some may claim that the novelty of the new medium influenced the viewers' judgments. As viewers have become more sophisticated with respect to television, their definition of "acceptable" may be

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<sup>9</sup> G. S. Kalagian; A Review of the Technical Planning Factors for VHF Television Service; Research & Standards Division, Office of Chief Engineer; FCC/OET RS 77-01; March 1, 1977.

*Jules Cohen, P.E.*  
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Engineering Statement  
MSTV Comments, Docket No. CS 98-201

Page 6

expected to change. A 1986 study<sup>10</sup> of subjective reaction to interference phenomena showed that may be the case. However, improvements in the radio noise figure of television receivers now provides an improvement in the C/N ratio at the receiver for the same signal strength. Whereas the Commission used a noise figure of 12 dB for VHF receivers and 15 dB for UHF receivers in 1952, receivers currently produced are more likely to have noise figures in the order of 6 dB for VHF and 8 to 10 dB for UHF.

9. The 1994 work of the Advisory Committee on an Advanced Television Service (ACATS) considered at length the signal strength required to provide an acceptable picture. Working Party 3 of the Planning Subcommittee devoted substantial effort, including numerous meetings and the preparation of a number of papers relative to the appropriate planning factors to apply to both the NTSC television service and to the new digital television service. The Working Party took into account both developments that might lead to an increased signal strength requirement (such as viewer sophistication) and developments that might lead to a decreased signal strength requirement (such as improved receivers). The conclusion of the Working Party was that Grade B, as defined by the Commission in 47

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<sup>10</sup> B.L. Jones, Subjective Assessment of Protection Ratios for UHF Broadcast Signals, CBS Technology Center Report 4/86; April 23, 1986; Document WG-1/55 in the final report of the Technical Analysis Working Group of the Land Mobile Radio/UHF Television Technical Advisory Committee; General Docket No. 85-172.

*Jules Cohen, P.E.*  
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Engineering Statement  
MSTV Comments, Docket No. CS 98-201

Page 7

C.F.R. § 73.683, still constituted the logical signal strength level for an acceptable (CCIR Grade 3) picture quality for the NTSC service.

10. In its attempt to replicate present NTSC analog service with the newly adopted digital television broadcast service, the Commission used Grade B to define the extent of NTSC service available to the public.<sup>11</sup> That reaffirmation of the applicability of Grade B for defining acceptable reception occurred only nine months ago.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on December 10, 1998.



Jules Cohen, P.E.

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<sup>11</sup> Memorandum Opinion and Order on Reconsideration of the Sixth Report and Order;  
MM Docket No. 87-268; FCC 98-24; Adopted February 17, 1998, Released February 23, 1998.